

PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventors: FREDERICK BRYDONE REED and ERNEST EUGENE GARDINER

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COMPLETE SPECIFICATION

Electric Illumination Devices

We H. FROST & COMPANY LIMITED, a British Company, of 34, Fieldgate, Walsall, Staffordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to electric illumination devices and an object of the invention is to provide simple and effective means for producing a simulated flame effect combined with a simulated fuel effect.

According to the invention, an electric illumination device comprises a translucent viewing screen; imitation solid fuel means; suspended flexible material disposed inwards of the viewing screen; a light source disposed inwards of the flexible material; and means for causing air flow for moving the flexible material to vary the lighting effect imparted by the device; the arrangement being such that when the device is in operation, the movement of upper portions of the flexible material in relation to light from the light source causes a random flickering effect visible, as a flame effect, through the viewing screen, and the movement of lower portions of the flexible material in relation to light from the light source causes a random flickering effect illuminating, from within the device, the imitation fuel means.

The suspended flexible material may be constituted by a row of flexible strips. There may be disposed intermediate the light source and the suspended flexible material a translucent inner screen which extends upwards for most of the height of the suspended flexible material and is illuminated by light from the light source, said translucent inner screen forming a backing panel spaced be-

hind the upper portions of the suspended flexible material, substantially all the light reaching the viewing screen from the light source, but substantially none of the light reaching the imitation solid fuel means from the light source, being diffused by this translucent inner screen. Or, the said translucent inner screen may be omitted. In one embodiment of the invention the line in plan of the flexible material is substantially rectilinear and the line in plan of the viewing screen is of a U-shaped formation. In another embodiment the line in plan both of the flexible material and the viewing screen is basically of a U-shaped formation, and in a further embodiment the line in plan both of the flexible material and of the viewing screen is circular in form.

Figure 1 of the accompanying drawings shows, partly in elevation and partly in vertical section, a front view of an electric illumination device constructed in accordance with the present invention, said illumination device being illustrated by way of example.

Figure 2 is a side elevation of the illumination device shown in Figure 1.

Figure 3 is a vertical section on the line III—III, Figure 1.

Figure 4 is a vertical section through another embodiment of the invention.

Figures 5 and 6 are vertical sections through two further embodiments of the invention.

Figure 7 is on a smaller scale than Figures 1 to 6 and is an elevation of another embodiment of the invention.

Figures 8 and 9 are sectional views on the lines VIII—VIII, Figure 7 and IX—IX, Figure 7, respectively.

Figure 10 is a horizontal sectional view

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through a further embodiment of the invention, and is on the same scale as Figures 7 to 9;

Figure 11 shows another embodiment of the invention.

Corresponding parts of the different embodiments shown in the drawings are indicated by the same reference number.

Referring to Figures 1 to 3 of the drawings, an electric illumination device comprises a casing 1 having upper and lower portions, the front and sides of the upper portion of said casing being formed by a translucent front viewing screen 2 of a U-shaped form in horizontal cross-section, and the front and sides of the lower portion of the casing 1 being formed by imitation solid-fuel means 3 constituted by a hollow moulding disposed below the screen 2 and having opaque portions, representing logs, or parts of logs, interspersed with translucent portions. (If desired, the hollow moulding may be formed to represent coal, instead of logs.) The casing 1 is closed at the rear by a metal wall 4 carrying a rearwardly-protruding lamp housing 5. The viewing screen 2 has an integral transparent lower extension 2a extending to the base of the device, the space between the screen 2, with its transparent extension 2a, and the rear wall 4, constituting a substantially air-tight compartment C.

Disposed inwards of the viewing screen 2, and situated inside the compartment C near the rear wall 4, is suspended flexible material constituted by a row of flexible strips 6 anchored at top and bottom to bracket means 7, 8, respectively, said bracket means being secured to the rear wall 4 of the casing. The strips 6 terminate at the bottom, in the particular embodiment illustrated, at about the level of the top of the fuel means 3. Each strip 6 is of a highly-reflective translucent material, for example satin nylon material. The upper tips of the strips may be blackened as shown.

Disposed behind the row of flexible strips 6, and contained in the lamp housing 5, is a red or orange light source formed by a pair of clear-glass red or orange electric light bulbs 9 the said bulbs 9 being horizontally mounted facing each other and being arranged to illuminate the strips 6 through a translucent window 10.

Means are provided for causing air flow inside the compartment C of the casing 1 to move the flexible strips 6 to vary the lighting effect imparted by the device, and for this purpose there is disposed, inside a bottom portion of the compartment C, an impeller 11 driven by an electric motor 12, said impeller 11 being situated beneath the bottom of the strips 6 and being in combination with a vortex former 13. The impeller 11 extends from one side of the compartment C to the other, and when in operation

causes a substantially even flow of air over the row of strips for the entire length of the row, whereby all the strips move to substantially the same extent.

The arrangement is such that when the device is in operation, that is, when the lamp bulbs 9 are alight and the impeller 11 is in operation, the strips 6 are given a fluttering motion by the air blown upwards by the said impeller, and some of the red or orange light from the bulbs 9 passes to upper portions 6a of the strips 6, the movement of said portions 6a in relation to said light causing a random flickering effect visible, as a flame effect, through the viewing screen 2, whilst some of the red or orange light from bulbs 9 passes to lower portions 6b of the strips 6, the movement of these lower portions 6b in relation to this light causing a random flickering effect illuminating, from within the device, the imitation fuel means 3 and imparting a realistic appearance to the translucent portions of said fuel means 3. Some of the light passing to the upper portions 6a of the strips 6 reaches the latter directly, and some of said light reaches the said portions 6a after reflection at the rear surface of the viewing screen 2. The path of the light from the bulbs 9 is illustrated diagrammatically by the broken lines in Figure 3. The air causing the movement of the strips 6 is continuously recirculated inside the substantially air-tight compartment C by the impeller 11 whilst the device is in operation, thus avoiding or minimising soiling of the strips 6 by airborne dust.

The arrangement just described is of a compact size in vertical cross-section and is simple in construction.

If desired, the window 10 can be omitted.

In the embodiment shown in Figure 4, the device has, as in the case of that shown in Figures 1 to 3, a U-shaped translucent viewing screen 2 with a transparent lower extension 2a, imitation solid-fuel means 3, suspended flexible strips 6, of highly-reflective translucent material disposed inwards of the screen 2, red or orange lamp means 9 disposed inwards of the strips 6, and impeller means 12 for blowing air over the strips 6, but there is disposed behind the strips 6, between the latter and the lamp means 9, a vertical translucent inner screen 14 which extends upwards for most of the height of the suspended flexible strips 6 and is illuminated by light from the lamp means 9, said inner screen 14 forming a backing panel spaced behind the upper portions of the strips 6, and terminating at its lower edge at a level spaced above that of the bottom of the said strips. The window 10 is omitted in this particular embodiment. In operation, the movement of the upper portions 6a of the air-blown strips 6 in relation to light from the light source results in a flame effect being

visible through the viewing screen 2, and the movement of the lower portions 6b of the strips 6 in relation to light from the light source results in a random flickering effect illuminating, from within the device, the imitation fuel means 3 whereby a realistic appearance is imparted to the translucent portions of the imitation fuel means, as in the embodiment shown in Figures 1 to 3. In the case of this embodiment shown in Figure 4, substantially all the light reaching the viewing screen 2 from the light source 9, but substantially none of the light reaching the imitation fuel means 3 from said light source 9, is diffused by the translucent inner screen 14.

If desired, the flexible strips 6 in the arrangement described with reference to Figure 4 may, instead of being translucent, be opaque strips.

The embodiment shown in Figure 5 is of the same construction as shown that in Figures 1 to 3, except that there is added, within the front portion (shown at 3a) of the imitation fuel means 3, a horizontal reflector 15 spaced beneath the top of said front portion 3a, said reflector increasing the movement and intensity of the light effect visible through the upper part of the front portion 3a of the imitation fuel means.

The embodiment shown in Figure 6 is likewise of the same construction as the embodiment shown in Figures 1 to 3, except that in this case there is added, within the front portion 3a of the imitation fuel means, an additional red or orange electric light source 16 which subdues the movement of, and increases the intensity of, the light effect visible through the lower part of the said front portion 3a. A horizontal opaque light baffle 17, which may be of aluminium is spaced immediately above the said additional light source 16, whereby to minimise the effect of the light source 16 on the movement of the light visible through the upper part of the front portion 3a of the imitation fuel means. The light baffle 17 has its upper surface finished to act as a reflector surface.

The above embodiments may be modified, if desired, by making the viewing screen straight, or slightly bowed, instead of U-shaped.

Figures 7 to 9 show an embodiment in which a translucent viewing screen 2', the line of a row of suspended flexible strips 6, a moulding 3' representing imitation fuel means, and an inner translucent light-diffusing screen 14', are all in plan, of a circular formation. A red or orange light source 9' is disposed inside a central space 19 defined by the circular inner screen 14'. An impeller 18 is provided for producing air flow for imparting a fluttering movement to the strips 6, and when the device is in operation some of the light from the light source 9' passes

to the upper portions 6a of the strips 6 whereby a flickering flame effect is visible through the viewing screen 2', and some of the light from said source passes to the lower portions 6b of the strips whereby the imitation fuel means 3' is illuminated by a random flickering effect. That part of the light from the source 9' which passes to the said upper portions 6a of the strips passes through the inner translucent screen 14', whilst that part of the light from said source which passes to the lower portions 6b of the strips passes undiffused through an annular air gap 14'a below the screen 14'. The flame effect and the fuel effect are visible from any side of this particular embodiment, and the said embodiment is designed to simulate a circular fire-place. The imitation fuel 3' is surrounded at the bottom by a circular wall 22, and the double-walled cylindrical structure formed by the screens 2', 14', is surmounted by a coned hood 20 leading to a simulated (but sealed) central cylindrical chimney. The inner screen 14' is supported by brackets such as those indicated at 21; and when the device is in operation air from the impeller flows, as shown by the arrows, down through the space 19, then through the gap 14'a, then up past the strips 6, and then back to the impeller for re-circulation.

Figure 10 shows, in horizontal cross-section an embodiment in which a translucent viewing screen 2'', the line of a row of suspended flexible strips 6, a moulding 3'' representing imitation fuel means, and an inner translucent screen 14'' are all, in plan, of a U-shaped formation. A red or orange light source 9'' is disposed inwards of the inner screen 14'' and when the device is in operation, with the strips 6 caused to flutter by air from an impeller (not shown), some of the light from the light source 9'' passes through the inner screen 14'' to upper portions of the strips 6 whereby a flickering flame effect is visible through the viewing screen 2'', and some of the light from said source 9'' passes undiffused beneath the screen 14'' whereby the imitation fuel 3'' is illuminated by a random flickering effect, the said flame effect and fuel effect being visible from the front and two opposite sides of the device. The device is provided with a base 23.

In any of the above-described embodiments, the viewing screen 2, 2', or 2'', may have a light diffusing surface having a multiplicity of closely-adjacent thin horizontal or near horizontal broken or unbroken lines extending from one side of the screen to the other and formed in a manner described in the specification of our United Kingdom Patent No. 957591. In the case of those of the embodiments described which have an inner translucent screen 14, 14', or 14'', the said screen 14 (which may, if desired, be

red or orange coloured) may have a light-diffusing surface having a multiplicity of closely-adjacent thin substantially horizontal lines formed in a manner described in our said specification No. 957591 and a multiplicity of closely-adjacent thin substantially vertical lines to produce a criss-cross pattern on the said screen.

If desired, the flexible strips may be caused to move by air drawn from outside, but it is preferred that the strips be moved not by air from outside but by air circulating in a substantially air-tight enclosure, in order, as hereinbefore explained, to avoid or minimise soiling of the strips by air-borne dust. Preferably, the air-moving arrangement is such that there is an even flow of air over the strips for the entire length of the row, whereby all the strips move to substantially the same extent, as in the case of the embodiment shown in Figures 1 to 3. If desired the arrangement may be such that the air flows downwards, instead of upwards, over the flexible strips.

The suspended flexible material may, instead of being in the form of separately-suspended flexible strips, if desired be in the form of a flexible sheet which has translucent portions, and/or is slit or cut away, the arrangement being such that when the device is in operation the movement of upper portions of the sheet in relation to light from the light source results in a flame effect visible through the viewing screen, and the movement of lower portions of the sheet in relation to light from the light source results in the imitation fuel being illuminated by a random flickering effect. An example of an embodiment utilising a flexible sheet is illustrated in Figure 11, which shows a device which is of the same construction as that illustrated in Figures 1 to 3 except that in place of the flexible strips there is provided a suspended flexible sheet 24 which is slit or cut away to provide a plurality of strips in the form of depending flexible tongues 25. The top edge of the sheet 24 is anchored to the bracket means 7, and the bottom ends of the tongues 25 are anchored to the bracket means 8. When the device is in operation the movement of upper portions 25a of the tongues 25 results in a flame effect visible through the viewing screen 2, and the movement of lower portions 25b of the tongues 25 results in a random flickering effect illuminating the imitation fuel means 3.

The device may, if required, form part of an electric heater.

Having regard to the provisions of Section 9 of the Patents Act, 1949, attention is directed to the claims of our Patent No. 978364.

WHAT WE CLAIM IS:—

1. An electric illumination device com-

prising a translucent viewing screen; imitation solid fuel means; suspended flexible material disposed inwards of the viewing screen; a light source disposed inwards of the flexible material; and means for causing air flow for moving the flexible material to vary the lighting effect imparted by the device; and the arrangement being such that, when the device is in operation, the movement of upper portions of the flexible material in relation to light from the light source causes a random flickering effect visible, as a flame effect, through the viewing screen, and the movement of lower portions of the flexible material in relation to light from the light source causes a random flickering effect illuminating, from within the device, the imitation fuel means.

2. An electric illumination device, as claimed in claim 1, wherein the suspended flexible material is constituted by a row of flexible strips.

3. An electric illumination device, as claimed in claim 1 or 2, wherein the line in plan of the flexible material is substantially rectilinear.

4. An electric illumination device as claimed in claim 1 or 2 wherein the line in plan of the flexible material and of the viewing screen is basically of a U-shaped formation.

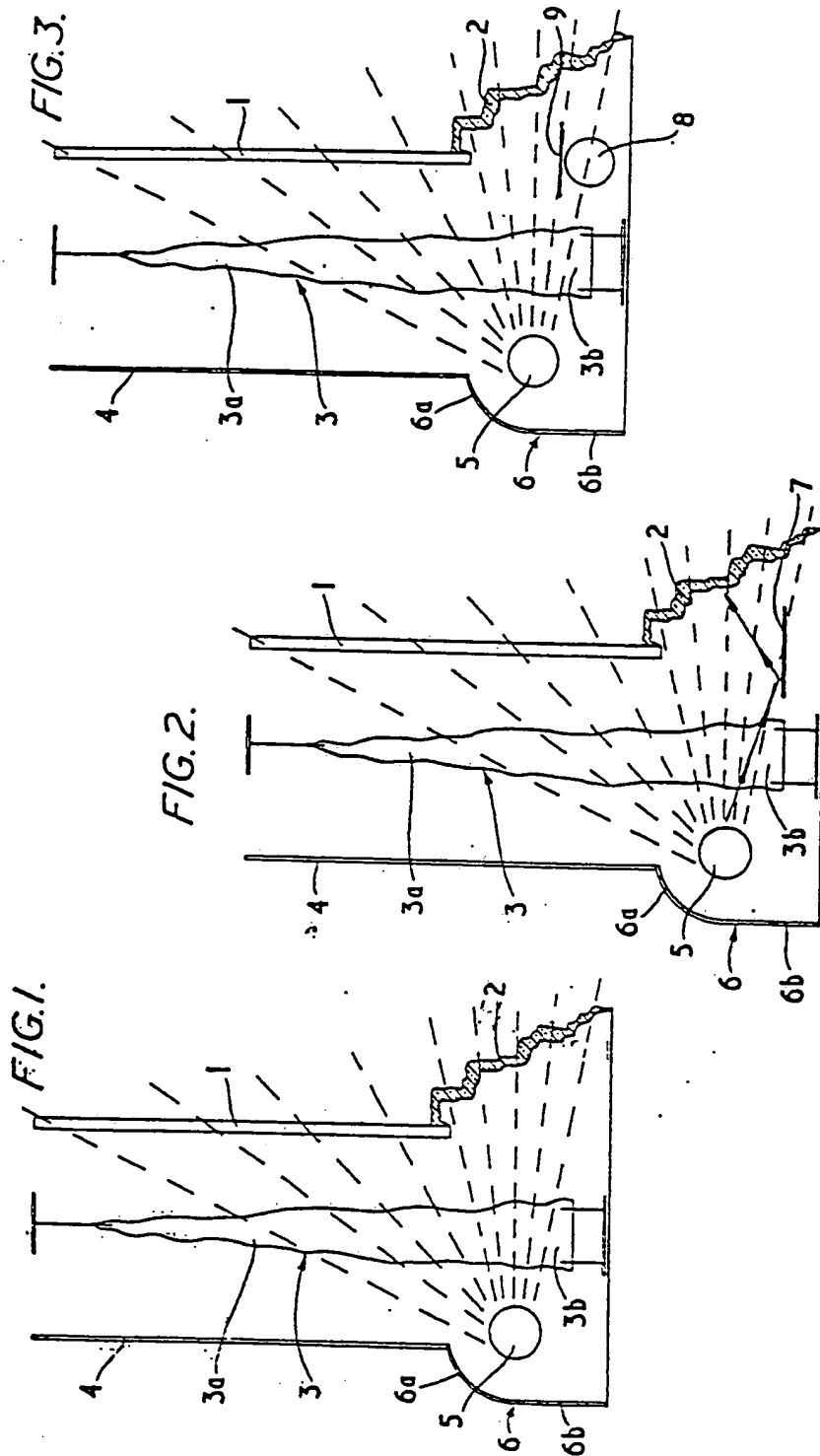
5. An electric illumination device, as claimed in claim 1 or 2, wherein the line in plan of the flexible material and of the viewing screen is circular in form.

6. An electric illumination device, as claimed in any one of claims 1 to 5, wherein a translucent inner screen is disposed intermediate the light source and the suspended flexible material and extends upwards for most of the height of the suspended flexible material and is illuminated by light from the light source, said translucent inner screen forming a backing panel spaced behind the upper portions of the suspended flexible material, substantially all the light reaching the viewing screen from the light source, but substantially none of the light reaching the imitation solid fuel means from the light source, being diffused by this translucent inner screen.

7. An electric illumination device, as claimed in claim 1 or 2, wherein there is disposed, beneath a top portion of the imitation fuel means, a reflector which increases the movement and intensity of light visible through said imitation fuel means.

8. An electric illumination device, as claimed in claim 1 or 2, wherein there is disposed, inwards of a lower portion of the imitation fuel means, an additional light source which subdues the movement of, and increases the intensity of, the light effect visible through the said lower portion of the imitation fuel means, said additional light

- source having disposed above it a light baffle which reduces the effect of the additional light source on the movement of the light visible through an upper portion of the imitation fuel means, and said light baffle having an upper surface finished to act as a reflector.
9. An electric illumination device, as claimed in claim 3 wherein the viewing screen is of a U-shaped formation in plan.
10. An electric illumination device, substantially as herein described with reference to Figure 1 to 3 of the accompanying drawings.
- 15 11. An electric illumination device, substantially as herein described with reference to Figure 4 of the accompanying drawings.
12. An electric illumination device, substantially as herein described with reference to Figure 5 of the accompanying drawings.
- 20 13. An electric illumination device, substantially as herein described with reference to Figure 6 of the accompanying drawings.
14. An electric illumination device, substantially as herein described with reference to Figures 7 to 9 of the accompanying drawings.
15. An electric illumination device, substantially as herein described with reference to Figure 10 of the accompanying drawings.
16. An electric illumination device, substantially as herein described with reference to Figure 11 of the accompanying drawings.
17. An electric heater incorporating an electric illumination device, said illumination device being constructed in accordance with any one of the preceding claims.
- H. N. & W. S. SKERRETT,
24 Temple Row, Birmingham 2.
Agents for Applicants



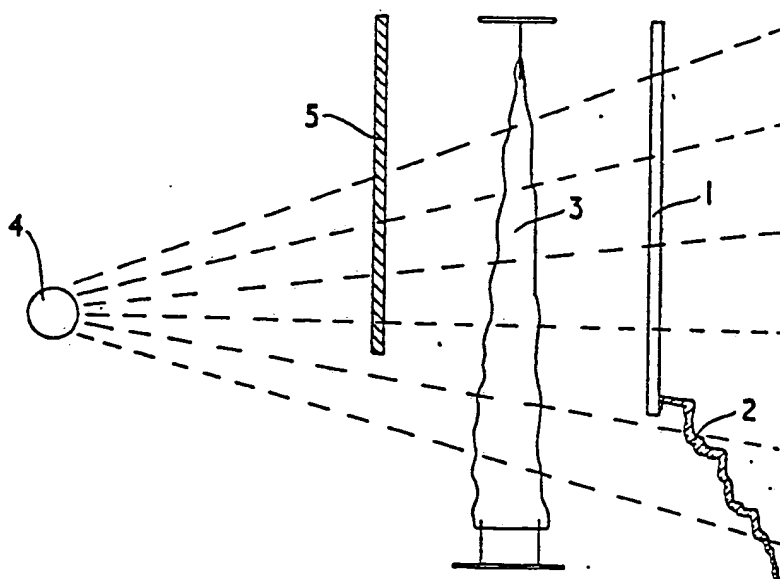


FIG.1.

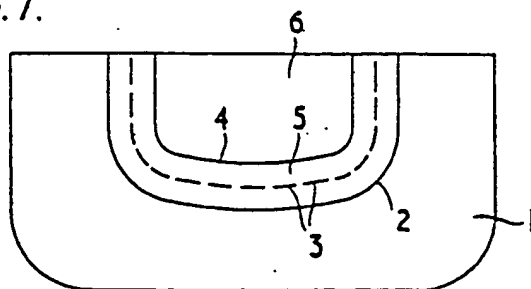


FIG.2.

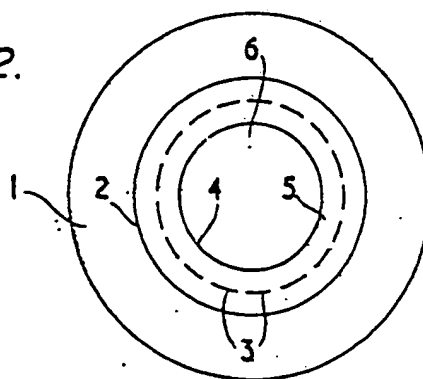
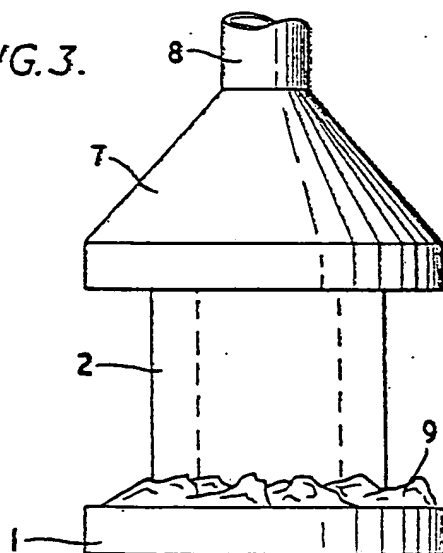


FIG.3.

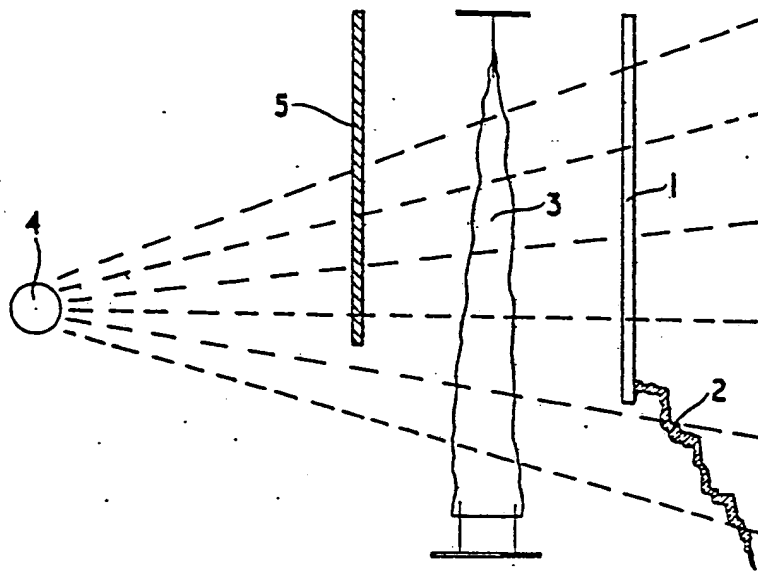


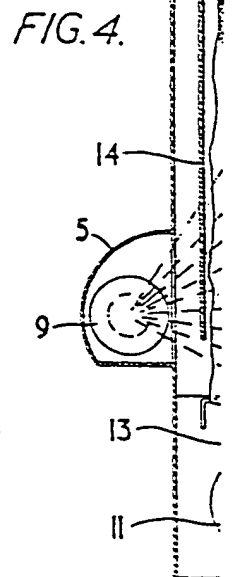
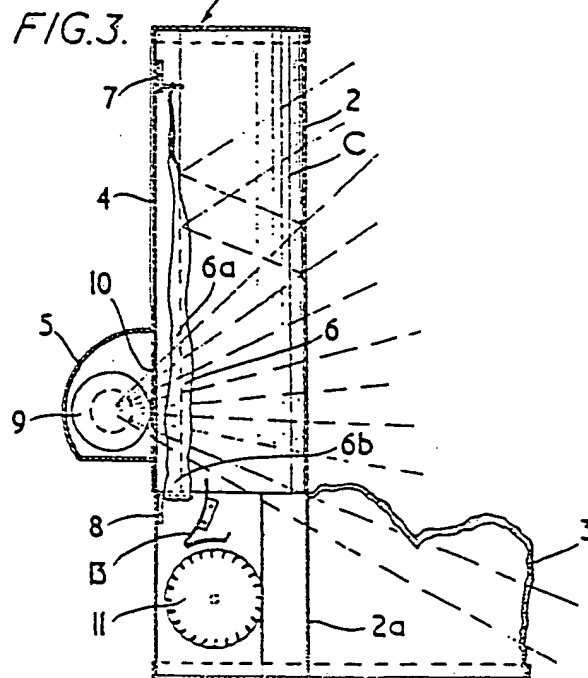
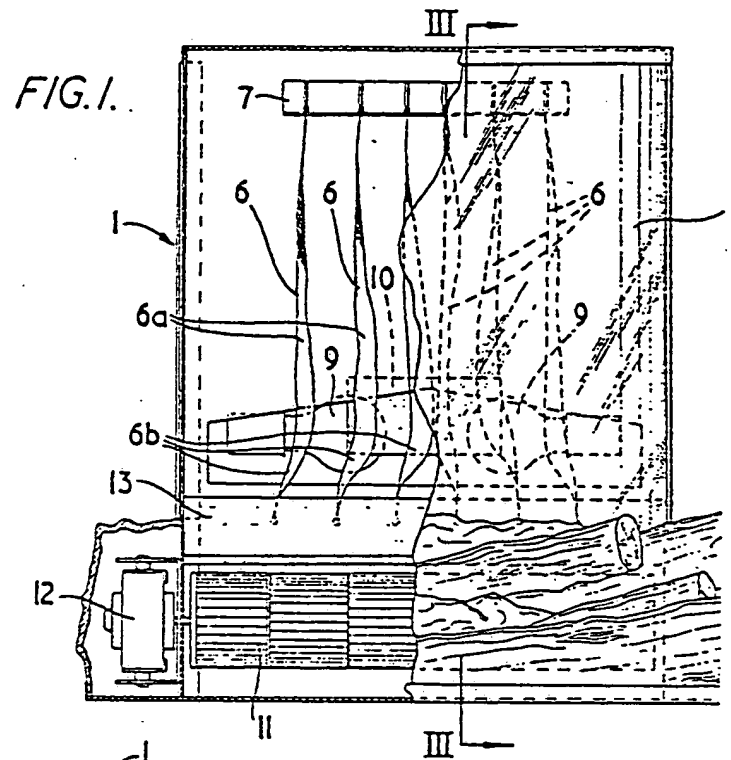
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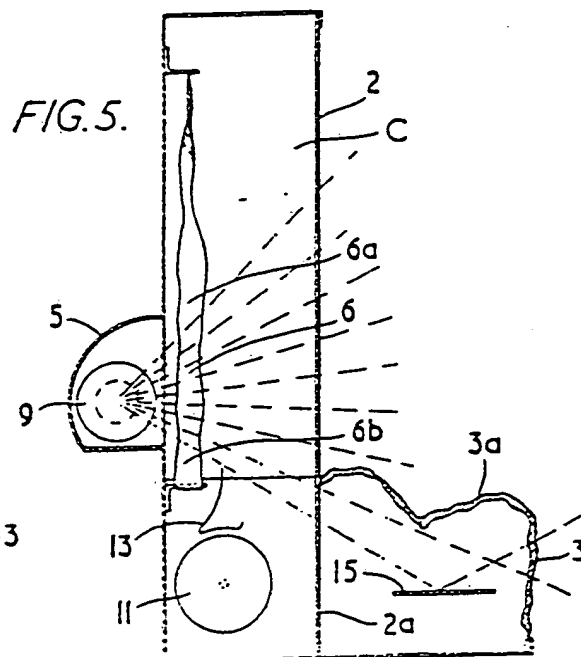
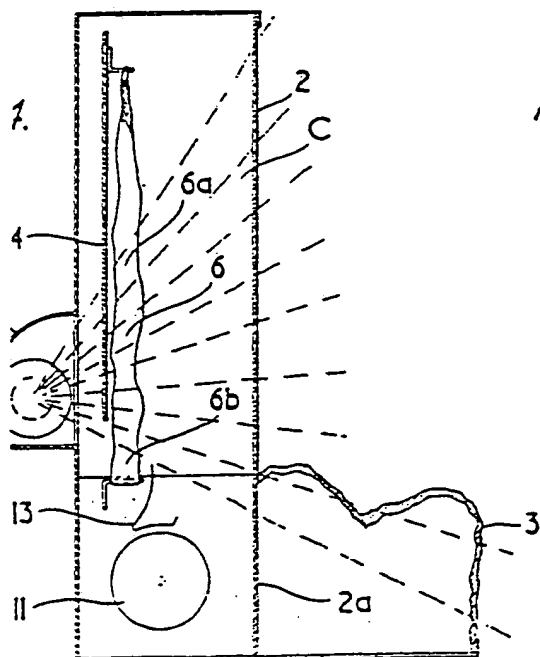
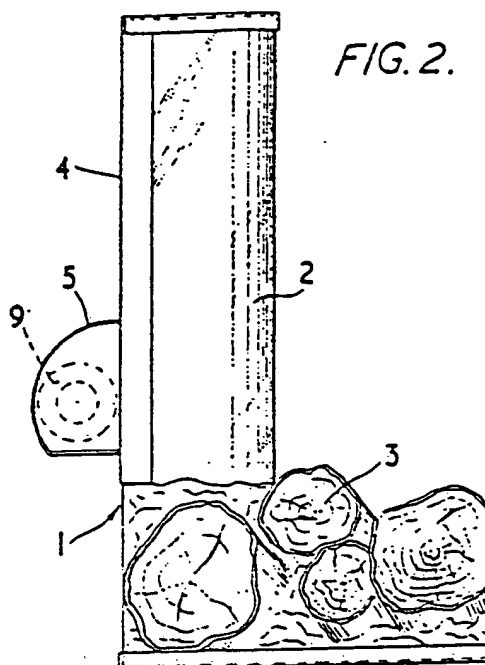
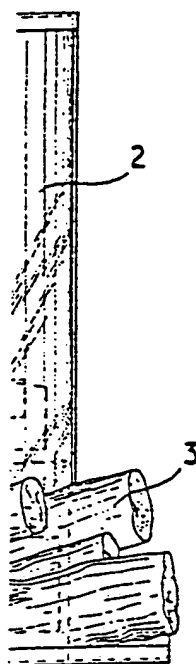
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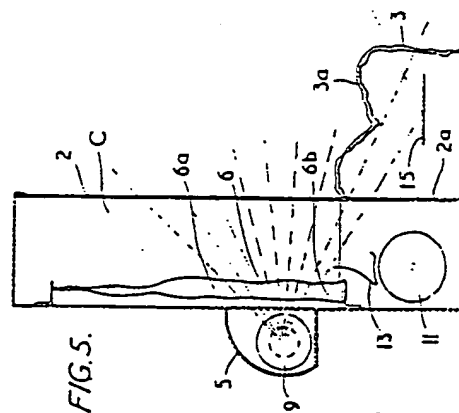
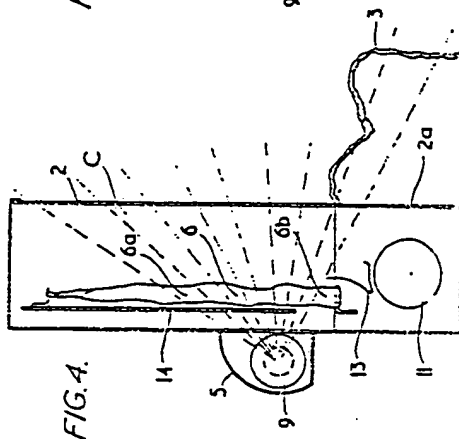
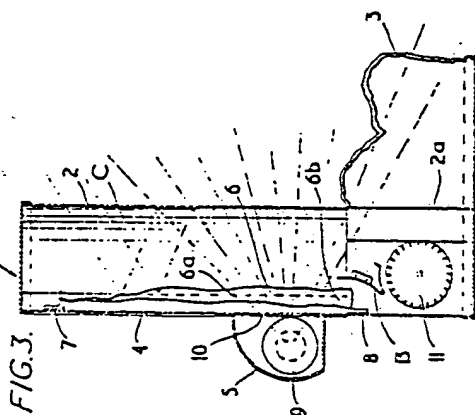
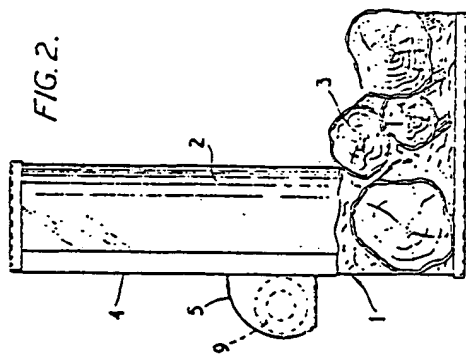
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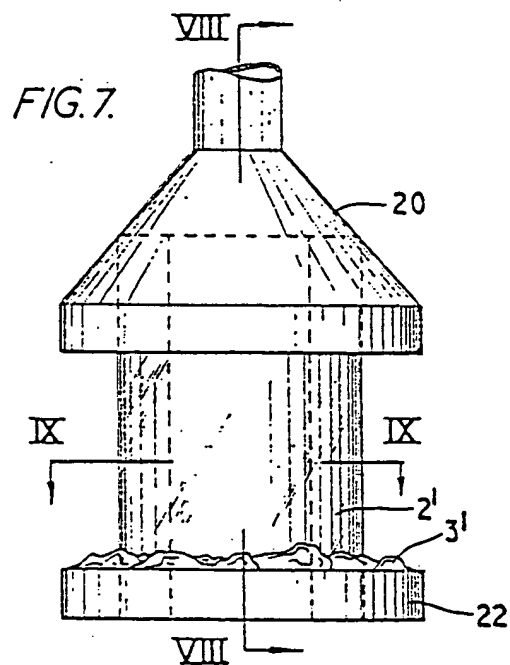
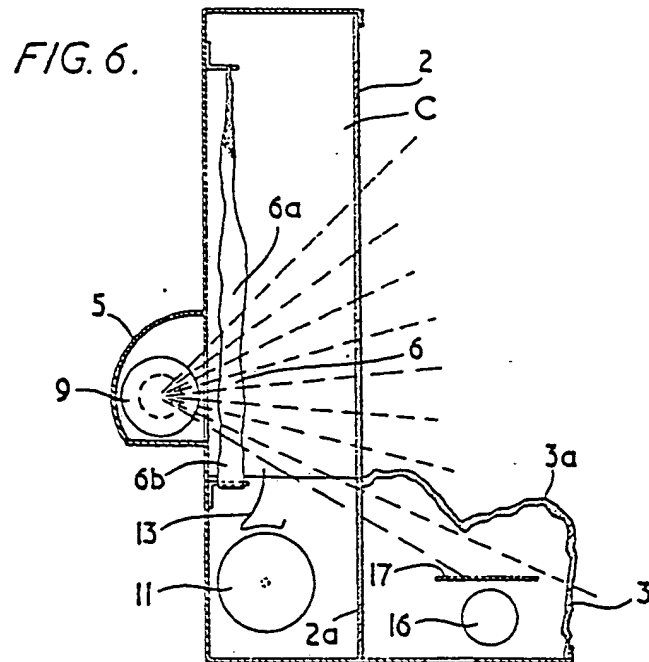
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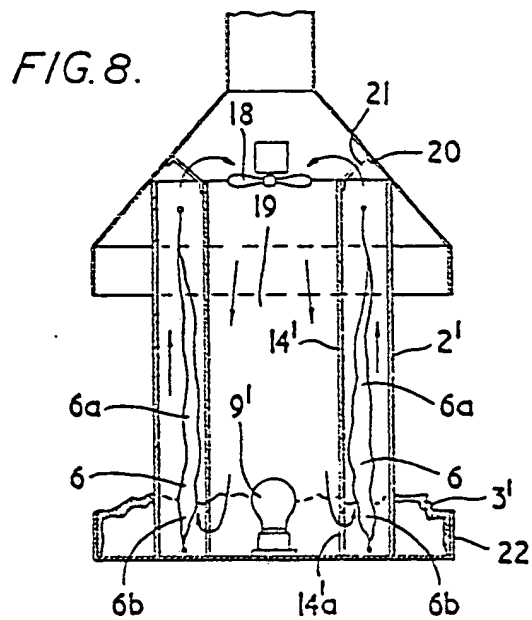


FIG. 9.

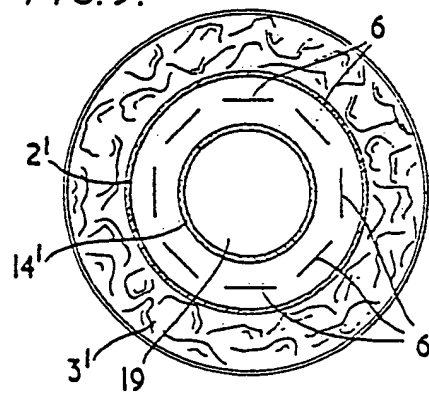


FIG. 10.

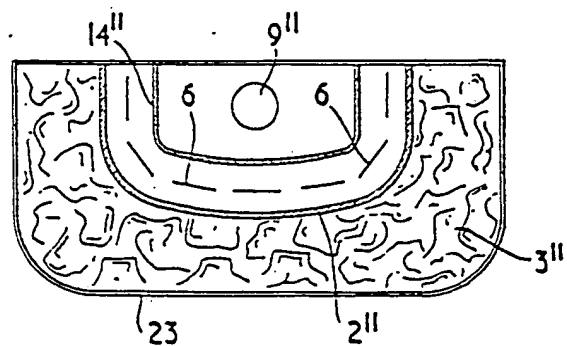


FIG. II.

